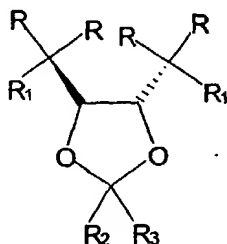


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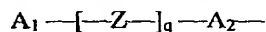
## WHAT IS CLAIMED IS:

1. An optically active compound of the formula:



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where the  $R_2$  and  $R_3$  groups are methyl, another lower alkyl group or an aryl or biaryl unit while the  $R_1$  groups independently each are a hydroxyl, alkoxyl, aryloxy, or arylalkoxy group, the  $R$  groups each represent a group as follows:



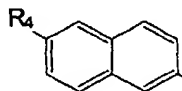
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where  $A_1$  is an aromatic group, an acyclic aliphatic group, or an alicyclic group, and  $A_1$  can be a substituted or unsubstituted group,  $Z$  is a group selected from  $-O-$ ,  $-OCO-$ , or  $-S-$ , and the coefficient  $q$  is 0 or 1.  $Z$  may also be  $(CH_2)_nO$  where the coefficient  $n$  is 0 to 5 and the coefficient  $q$  is 1.  $A_2$  is a bivalent radical of a naphthalene group, and the cyclic structure of  $A_2$ , or  $A_1$  if it is cyclic, optionally can be heterocyclic, such as by replacement of one or more

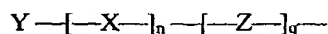
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CH member(s) of the ring structure with N, O and/or S.

2. The optically active compound of claim 1, where each  $R$  substituent is independently selected as:



- 20 where  $R_4$  represents a group as follows:



KD-01-004PCT

where n is an integer value of 0 or 1 or more, X is  $-\text{CH}=\text{CH}-\text{CH}_2-$ , or  $-(\text{CH}_2)_m-$  where m is an integer value of 1, 2, 3, or more, Y is a radical of an aromatic hydrocarbon, an acyclic aliphatic hydrocarbon, or an alicyclic hydrocarbon, and Y can be a substituted or unsubstituted group, and Z and q have the same respective meanings as defined in claim 1.

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3. The optically active compound of claim 2, where  $\text{R}_4$  is an aryloxy radical, an arylalkoxy radical, an arylalkyleneoxy, or an arylalkenyleneoxy radical.

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4. (4R,5R)-2,2-dimethyl- $\alpha,\alpha,\alpha',\alpha'$ -tetrakis[6-(benzyloxy)naphth-2-yl]-1,3-dioxolane-4,5-dimethanol.

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5. A liquid crystalline mixture, comprising:  
a liquid-crystalline base having liquid crystalline properties;  
at least one optically active compound of the formula as described in  
any of one of claims 1-4.

6. The liquid crystalline mixture according to claim 5, further including an achiral non-liquid crystalline compound.

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7. The liquid crystalline mixture according to claim 6, wherein the achiral non-liquid crystalline compound comprises  $\text{R}^1-\text{C}\equiv\text{N}$ , where  $\text{R}^1$  represents an aliphatic group.

8. The liquid crystalline mixture according to claim 7, wherein  $\text{R}^1-\text{C}\equiv\text{N}$  comprises an alkynitrile.

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9. The liquid crystalline mixture according to claim 7, wherein  $\text{R}^1-\text{C}\equiv\text{N}$  comprises undecanenitrile.

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10. An electro-optical cell comprising a layer including a liquid crystalline mixture as described in any one of claims 5-9 sandwiched between two substrate means, and means for applying an electric potential to the substrate means.

KD-01-004PCT

11. A light modulating apparatus comprising an electro-optical cell according to claim 10.

5 12. The light modulating apparatus according to claim 11, wherein the light modulating apparatus comprises a cholesteric display.

13. An electro-optical cell comprising:  
a layer comprising:

10 at least 70 weight percent (wt%) nematic host mixture; and  
at least about 2 wt% (4R,5R)-2,2-dimethyl- $\alpha,\alpha',\alpha'$ -tetrakis[6-(benzyloxy)naphth-2-yl]-1,3-dioxolane-4,5-dimethanol;  
first and second substrates disposed above and below, respectively, the layer; and  
first and second conductors physically coupled to the first and second substrates,  
15 respectively, which permit an electrical potential to be applied across the layer.

14. The electro-optical cell as recited in claim 13, wherein the layer further comprises about 2-6 wt% achiral material.

20 15. The electro-optical cell as recited in claim 13, wherein the layer further comprises a chiral material different from (4R,5R)-2,2-dimethyl- $\alpha,\alpha',\alpha'$ -tetrakis[6-(benzyloxy)naphth-2-yl]-1,3-dioxolane-4,5-dimethanol and having an opposite twist sense.

25 16. A light modulating apparatus comprising an electro-optical cell according to any one of claims 13-15.

17. The light modulating apparatus according to claim 16, wherein the light-modulating apparatus comprises a cholesteric display having a temperature independent reflective wavelength.